

REMARKS

Claims 1-15 and 25-40 are pending in the present application. Claims 1, 15, 25, 26, and 40 are independent.

35 U.S.C. §112, SECOND PARAGRAPH REJECTION

Claims 26-39 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Specifically, the Examiner asserts that it is unclear what structure the first two lines of claim 26 define.

Applicants respectfully submit that the limitation "a semiconductor substrate made of one of a plurality of pieces into which a wafer is divided" is not indefinite. As shown in Figure 1 of the present application, the semiconductor wafer 11 can be divided into a plurality of sections, or pieces, which are indicated by the dotted lines. Figure 1 further shows the acoustic wave devices 12a-d each include a semiconductor substrate (labeled as element 14 in Figure 2), which is actually composed, or made of, one of the sections of the semiconductor wafer 11.

Applicants respectfully submit that the above limitation of claim 26 clearly defines the silicon substrate of a film acoustic wave device as one of these sections of the silicon wafer, which is shown by the dotted lines of Figure

1. Accordingly, reconsideration and withdrawal of this rejection is respectfully requested.

35 U.S.C. § 102(a) REJECTIONS

Rejection of Claims 1-15

Claims 1-15 stand rejected as being anticipated by U.S. Patent No. 5,194,836 to Vale et al. (hereafter Vale), U.S. Patent No. 5,185,589 to Krishnaswamy et al. (hereafter Krishnaswamy), U.S. Patent No. 5,160,870 to Carson et al. (hereafter Carson), and U.S. Patent No. 3,401,275 to Curran et al. (hereafter Curran). These rejections are respectfully traversed for the following reasons.

Independent claim 1 recites a film acoustic wave device comprising a pattern that is formed by at least a ground electrode, piezoelectric thin film, and at least one upper electrode formed on the thin film. Claim 1 further recites the shape of the pattern of the film acoustic wave device is dependent upon the position at which the film acoustic wave device is mounted on the wafer.

In Applicants' Remarks filed January 25, 2001, Applicants argued that none of Vale, Krishnaswamy, or Carson teaches a film acoustic device in which the shape of the pattern is dependent upon the position at which the film acoustic wave device is mounted on the wafer. In the currently outstanding Office Action, the Examiner responds by asserting that this limitation of claim

1 is not structurally discerning in the final product. Applicants respectfully disagree.

Claim 1 clearly recites a pattern that is formed of structural elements, i.e., ground electrode, piezoelectric thin film, and at least one upper electrode. Applicants respectfully submit that the shape of this pattern clearly imparts a structural limitation on the film acoustic wave device. Applicants further submit that the position at which of the film acoustic wave device is mounted on the wafer clearly suggests another structural element. Therefore, the dependency of the shape of the pattern on the position of the film acoustic wave device clearly defines a cooperative relationship between structural elements (i.e., the pattern and the physical location) of the claimed invention.

As cited in Applicants' Remarks of January 25, 2001, the CAFC clearly indicated that claim language identifying a physical location clearly suggests a structural element in *Cole v. Kimberly-Clark Corp.*, 41 USPQ2d 1001 (1996). Accordingly, Applicants argued that the position of the film acoustic wave device on a wafer must be given the same consideration as any other structural element. However, in the outstanding Office Action, the Examiner seemingly takes the contrary position that the physical location, or position, of an element does not "structurally discern" the elements of the claimed invention. Should the Examiner maintain this position in a subsequent Office Action, Applicants respectfully request that the Examiner provide an explanation of his position in view of the decision in *Cole*.

For the reasons set forth above, Applicants respectfully submit that the feature in claim 1 corresponding to the shape of the pattern being dependent upon the position at which the film acoustic wave device is mounted on the wafer, is structurally discerning in the final product. Applicants further respectfully submit that none of Vale, Krishnaswamy, Carson, or the newly cited Curran teaches this feature.

In the outstanding Office Action, the Examiner asserts, "[i]t must be assumed that any final structure was at some point dependent upon how it was applied" (page 2). In response to this assertion, Applicants respectfully note that claim 1 does not recite a dependency of the pattern shape on *how* it was applied, but rather on the *position* at which the device is mounted.

Further, Applicants respectfully submit that the Vale, Krishnaswamy, and Carson patents each recite a substrate containing a plurality of devices at different locations of the substrate, where each device has an identical pattern shape. The pattern shapes disclosed by these patents are clearly *not dependent* upon the position of the devices on a substrate. Therefore, these patents provide evidence that an assumption *cannot* be made that the pattern shapes of such devices at some point depends on where it was applied, and teach away from claim 1. Applicants further submit that Curran provides absolutely no teaching or disclosure that the pattern shape of a device depends on the position of the device on a substrate.

Applicants respectfully submit that independent claim 15 recites features similar to that of claim 1. Applicants respectfully submit that claims 1 and 15 are allowable at least for the reasons set forth above. Applicants further respectfully submit that claims 2-14 are allowable by virtue of their dependency on claim 1, at least for the reasons set forth above.

Rejection of Claim 40

Claim 40 stands rejected under 35 U.S.C. § 102(a) as being anticipated by U.S. Patent No. 3,676,724 to Berlincourt et al. (hereafter Berlincourt). This rejection, insofar as it pertains to the presently pending claims, is respectfully traversed for the following reasons.

Independent claim 40 has been amended to more clearly recite that the pattern shape corresponding to the plurality of elements on the substrate is changed by a position at the substrate. For the reasons discussed above with respect to independent claim 1, Applicants submit that this feature structurally discerns the invention of claim 40.

Berlincourt discloses a multi-element circuit component formed on two surfaces a wafer. While Berlincourt teaches that the area covered by an element (electrode) can be changed in order to change the frequency characteristics of the circuit component, Applicants respectfully submit that Berlincourt fails to teach or suggest that the pattern shape formed on either surface changes according to the position of the pattern on the substrate.

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Applicants respectfully submit that claim 40 is allowable at least for the reasons set forth above. Reconsideration and withdrawal of this rejection is respectfully requested.

35 U.S.C. § 103(a) REJECTION

Claims 25-39 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Carson, Krishnaswamy, or Vale in view of Curran. This rejection is respectfully traversed for the following reasons.

In page 3 of the outstanding Office Action, the Examiner states that Carson, Vale, and Krishnaswamy teach the claimed invention except that the electrode areas are not explicitly varied. The Examiner asserts that Curran explicitly teaches that the frequency can be set or tuned via changing electrode area. The Examiner further asserts that lead line length and area also effects impedance in a known, predictable manner. The Examiner states that to vary the electrode and/or lead architecture of Krishnaswamy, Carson, or Vale would have been obvious to one of ordinary skill in the art.

Applicants respectfully submit that they cannot find the disclosure of Curran that teaches that frequency can be set or tuned according to electrode area. Applicants submit that the passage of Curran cited by the Examiner (column 4, lines 4-62) merely disclose that the frequency characteristics of a device is determined by the composite thickness (including wafer and electrodes) of the wafer. Applicants therefore assume that, in this prior art

rejection, the Examiner is actually referring to the disclosure of Berlincourt, which teaches that electrode area can determine passband and center frequency characteristics in column 4 lines 4-35.

Applicants respectfully submit that independent claims 25 and 26 each recite that a pattern shape of the film acoustic wave device differs, or is changed, according to the position of the device at the wafer. Applicants respectfully submit that none of the cited prior art references, including Curran and Berlincourt, teach this feature.

Applicants respectfully submit that when multiple film acoustic wave devices are formed on different locations of a wafer, one problem that generally arises is the variance in thickness of the wafer that occurs due to the sputtering the piezoelectric thin film onto the wafer during the production process. As a result, the film acoustic wave devices positioned at various locations of the wafer will therefore have varying wafer thickness which result in each of the film acoustic wave devices producing different frequency ranges. Adjusting the wafer thickness at the different locations during production is too expensive.

The above-mentioned feature of claims 25 and 26 provides a less costly way to solve this problem. According to this feature, the claimed invention compensates for the variance in film thickness on the wafer by changing the pattern shapes of the respective film acoustic wave devices. The variance in

pattern shape is dependent upon the specific position of the film acoustic device on the wafer.

Applicants respectfully submit that this problem is not contemplated by either of Curran or Berlincourt, nor is it contemplated by any of Carson, Krishnaswamy, and Vale. Applicants respectfully submit that recognition of the problem, as well as Applicants' particular solution to the problem, is indicia of non-obviousness of the present invention, as claimed in claims 25 and 26. In support of this position, Appellant cites *In re Spinnoble*, 160 USPQ 237 (C.C.P.R.E. 1969). In *Spinnoble* at 243, the Court stated that:

It should not be necessary for this Court to point out that a patentable invention may lie in the discovery of the source of the problem even though the remedy may be obvious once the source of the problem is identified. This is part of the 'subject matter as a whole' which should always be considered in determining the obviousness of an invention under 35 U.S.C. § 103.

Appellant respectfully submits that the Examiner has failed to consider both Appellant's recognition of the problem in the art, namely the variance in wafer thickness due to the production process, as well as Appellant's solution to the problem in determining the obviousness of the present invention. Appellant respectfully submits that Applicants' recognition and solution to a problem that is not contemplated in any of the prior art references cited in this rejection.

Applicants respectfully submit that claims 25 and 26 are allowable at least for the reasons set forth above. Accordingly, Applicants respectfully submit that claims 27-39 by virtue of their dependency on claim 26, at least for

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the reasons set forth above. Therefore, reconsideration and withdrawal of this rejection is respectfully requested.

CONCLUSION

In view of the above amendments and remarks, reconsideration of the various rejections and allowance of claims 1-15 and 24-40 is respectfully requested.

In the event that there are any outstanding matters remaining in the present application, the Examiner is invited to contact the undersigned at (703) 205-8000 in the Washington, D.C. area, to discuss this application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. 1.16 or under 37 C.F.R. 1.17; particularly, extension of time fees.

Respectfully submitted,

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Attachment: Version with Markings to Show Changes Made